

# AN ATLAS OF SKIAGRAMS

ILLUSTRATING THE  
DEVELOPMENT OF THE TEETH

JOHNSON SYMINGTON  
AND  
J. C. RANKIN

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# AN ATLAS OF SKIAGRAMS





# AN ATLAS OF SKIAGRAMS

ILLUSTRATING THE  
DEVELOPMENT OF THE TEETH  
WITH EXPLANATORY TEXT

BY

JOHNSON SYMINGTON, M.D., F.R.S.

PROFESSOR OF ANATOMY, QUEEN'S COLLEGE, BELFAST

AND

J. C. RANKIN, M.D.

PHYSICIAN IN CHARGE OF THE ELECTRICAL DEPARTMENT, ROYAL  
VICTORIA HOSPITAL, BELFAST

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# INTRODUCTION

AT the Annual Meeting of the British Dental Association held in Belfast last June we exhibited a series of skiagrams to illustrate certain stages in the development of the teeth in man. The favourable opinion which was then expressed as to the scientific interest and practical value of these skiagrams has induced us to reproduce and publish them in a collected form.

Since the discovery in 1895 by Professor Röntgen of the peculiar properties of the emanations from the antikathode of a vacuum tube, these so-called X-rays have frequently been used to obtain skiagrams of teeth in the living subject for diagnostic purposes and as an aid to treatment, but hitherto no systematic attempt appears to have been made to examine by this agency the position and relations of all the teeth during their development from infancy to adult life.

In this investigation the head was divided in the median plane, and as a rule the soft parts in the region of the jaws, except the gums, were removed. Each half was then placed with its lateral aspect upon a photographic plate which was enclosed as usual in light-proof envelopes. It was found that when the rays were directed downwards upon the specimen with its median cut surface in a horizontal plane, the shadows cast by the central and lateral incisors were apt to nearly coincide with one another, so that their individual form could not satisfactorily be distinguished. Accordingly the posterior part of the skull was raised about  $30^{\circ}$  above the horizontal plane, by which means this overlapping of the shadows of the teeth at the anterior part of the dental arch was to a considerable extent avoided, and all the teeth on one side of the median plane were projected separately on to the photographic plate. In some cases the greater part of the skull was removed in order to bring the jaws as close as possible to the plate, since the shadows of the teeth are then more sharply defined.

In nearly all the skiagrams the upper teeth are less distinctly seen than the lower. This is due to the shadow of the hard palate crossing these teeth, and also to the prominences of the malar and of the frontal bone, which interfere with the close approximation of the upper dental arch to the photographic plate.

The antikathode was fixed about nine inches above the photographic plate, imperial

## INTRODUCTION

special rapid plates were used, and the exposure was generally rather less than half a minute. Soft tubes gave the best results when the negatives were viewed as transparencies, or used in the preparation of half-tone blocks, but in some cases better prints were obtained from plates acted upon by rays from medium tubes.

All the figures in this Atlas are of the same size as the original negatives, and are slight enlargements of the actual specimens. They show the teeth and jaws as seen from the lateral aspect and somewhat from the front. The negatives were not touched up in any way, and were given to the process-block makers with instructions to copy them as accurately as possible. It is difficult to avoid some slight loss of detail by any known method of reproduction, but every effort has been made to reduce such losses to a minimum, and we desire to thank Messrs. W. & G. Baird of this city for the great care and skill with which they executed our orders.

In the explanation printed opposite each plate no attempt has been made to give a minute and exhaustive description of the skiagrams. The reader is assumed to be familiar with the general anatomy of the teeth and their development as described in any ordinary text-book of anatomy. Provided with this knowledge, the student will have little difficulty in interpreting the skiagrams.

Until the teeth of the first dentition begin to fall out and be replaced by their permanent successors, there is little difference between the teeth on the two sides; indeed, in nearly every case we have found the resemblance to be very marked. For this reason it was not considered necessary to figure both sides in children under seven years.

The period during which the temporary teeth are being replaced by their permanent successors is one in which the position and condition of both sets are of great practical interest, and a bilateral symmetry the exception rather than the rule. We have, therefore, shown both right and left halves in the four children, one aged seven, another nine, and two ten years.

As the series of skiagrams were taken from eighteen children, whose ages ranged from birth to sixteen years, and from one adult, a practically complete history of the calcification of each tooth, whether temporary or permanent, will be found recorded in the plates of this Atlas.

The figures A to E, printed with the text, are drawings of specimens dissected to illustrate the relations of the maxillary sinus to the teeth at various periods of life. The specimens were prepared by removing the greater part of the bony wall of the sinus, narrow bars of bone being, however, left *in situ* for the support of the lining membrane. Professor G. Killian has shown that by hardening the head in formol the mucoperiosteal

## INTRODUCTION

membrane of the accessory nasal sinuses acquires a firm resilient character, so that the shape of the sinuses is retained after the removal of the bone. These drawings are of the natural size, and show the muco-periosteal lining of the maxillary and other accessory nasal sinuses viewed from the lateral aspect. The interior of the sinuses can easily be examined in specimens prepared in the way described above, by reflecting a flap of the lining membrane. The dissections for these figures were made by Dr. P. T. Crymble and the drawings by Miss Alice M'Hinch.

Dr. Rankin took the skiagrams, and Professor Symington is responsible for the preparation of the specimens and for the text.

QUEEN'S COLLEGE, BELFAST,  
*July 1908.*



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**PLATE I**

## EXPLANATION OF PLATE I

**Fig. 1.—Left Side of newly-born Female Infant 19 inches long.**

The milk teeth are visible in the skiagram, calcification having commenced in each of them. They are all 3 mm. to 5 mm. from the surface of the gums, and the molars are below the openings of their incomplete alveolar sockets. The shadows of the lower lateral incisor and canine partially overlap one another, and the first molar is more calcified than the second molar.

The multicuspidate teeth begin to calcify by independent deposits on the apices of prominences on the dental papilla, and the separate cusps thus formed are gradually united by an extension of the calcification over the surface of the less projecting portions. This process is well seen in the second lower molar, as owing to the crown of this tooth being directed inwards as well as upwards the shadows from its cusps do not overlap, and are therefore clearly distinguishable from one another. The antero-internal cusp is still isolated, but the other four are united.

The crypt for the first lower permanent molar is of large size, and extends backwards and upwards into the anterior part of the ramus of the mandible; the antero-lateral cusp of its contained papilla has just commenced to calcify.

In skiagrams taken from a seven-months fœtus all the milk teeth were seen, but the calcification was much less advanced than in full-time fœtuses. Of these teeth the incisors were most distinct, the canine showed a minute white spot at its apex, in the first molar points of calcification could be detected on three cusps, the antero-external being best developed, and the other two barely visible to the naked eye. The second molar was less advanced in its calcification; its antero-external cusp was about half the size of the corresponding cusp in the first molar, and two other cusps could be detected when the negative was examined with a magnifying glass. The crypt for the first permanent molar was outlined, but its contained tooth was not visible.

In a skiagram of a five-months fœtus only one cusp was seen on the first molar, and the second molar had apparently not yet commenced to calcify.

**Fig. 2.—Right Side of Male Infant one month old and 21½ inches long.**

There is no important difference between this specimen and that of the newly-born infant, but the calcification of the milk teeth is more advanced, and consequently the shadows they cast upon the photographic plate are stronger.

The crypt for the lower first permanent molar is clearly outlined, except in front, where it is freely continuous with that for the second temporary molar. As in the newly-born infant, only one cusp of the first permanent molar is calcifying.

# PLATE I

FIG. 1.

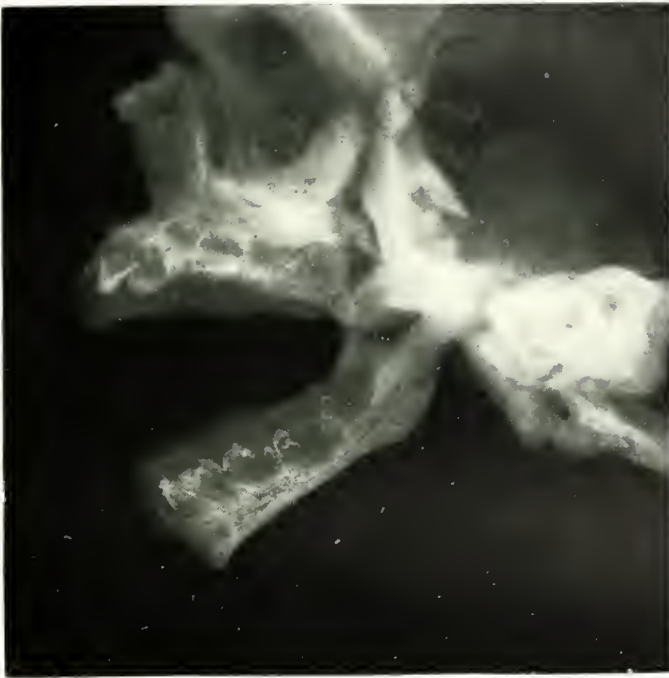


FIG. 2.





**PLATE II**

## EXPLANATION OF PLATE II

**Fig. 1.—Left Side of Male Infant four and a half months old and 25 inches long.**

Before taking this skiagram we removed the soft parts of the face, but left the eyeball in position. None of the teeth have erupted, but the lower central incisor is close to the surface, and the two upper incisors have not far to travel before cutting the gum. The calcification of the crowns of the milk teeth has advanced considerably as compared with their condition at birth, but they still contain a large central cavity occupied by soft tissues, and the roots of these teeth have not yet commenced to form. The cuspidate surface of the crown of the upper first permanent molar looks downwards and backwards, whereas the lower first permanent molar not only looks upwards and forwards but also distinctly inwards. Of the four cusps of the lower permanent molar calcified at this period the two external are better developed than the two internal cusps.

**Fig. 2.—Left Side of Female Infant six months old and 27 inches long.**

Both eyeball and tongue were left in position. All the teeth are still concealed by the gums, but the left upper lateral and lower central incisors are almost through. The degree of calcification of the milk teeth is about the same as in the last specimen; the lower first permanent molar now shows all its five cusps, but they are not yet completely joined together.

The development of the permanent incisors and canines is so far advanced that traces of some of them can be detected in the skiagrams of this infant and also of the one four and a half months old.



## PLATE II

FIG. 1.



FIG. 2.





**PLATE III**

## EXPLANATION OF PLATE III

**Fig. 1.—Left Side of Female Infant nine months old and  $26\frac{1}{2}$  inches long.**

The length of this infant was half an inch less than the one six months old shown in Plate II., Fig. 2, but its dentition is more advanced.

Only one tooth in the mandible, viz. the central incisor, is through, and the other milk teeth are covered by a considerable thickness of gum, while in the maxilla both incisors are near the surface. The roots of the lower first temporary molar are just beginning to form. The first permanent molars look in the same direction as in the two specimens shown on Plate II., but the calcification of their crowns is more advanced.

**Fig. 2.—Left Side of Female Infant one year old and 29 inches long.**

All the incisors have erupted and also the first upper molar, while the first lower molar is about to appear.

The dental development shows a considerable advance on the nine months infant. The roots of the first temporary molars are now somewhat more distinct, but the second molars show no signs of root development.

The first permanent upper molar is seen to extend backwards close to the tuberosity of the maxilla, from the surface of which it is separated by a thin plate of bone.

The permanent incisors and canine are now clearly visible in the mandible; the central incisor opposite the lower ends of the two milk incisors, the lateral incisor overlapped by the lower and anterior part of the temporary canine, and the permanent canine between the temporary canine and the first molar.

# PLATE III

FIG. 1.



FIG. 2.





**PLATE IV**



## EXPLANATION OF PLATE IV

Fig. 1.—Right Side of Male Infant fifteen months old and 28 inches high.

This skiagram was taken after the skull had been cleaned, but not macerated, and then dried, so that the gum is shrunken.

The incisors and first molars have erupted, but the temporary canine and second molars are still covered by the gum, although from the skiagram it might be supposed that these teeth had also erupted. The first milk molars have now distinct roots, which, however, have thin walls and large openings at their apices. The second milk molars are still destitute of roots.

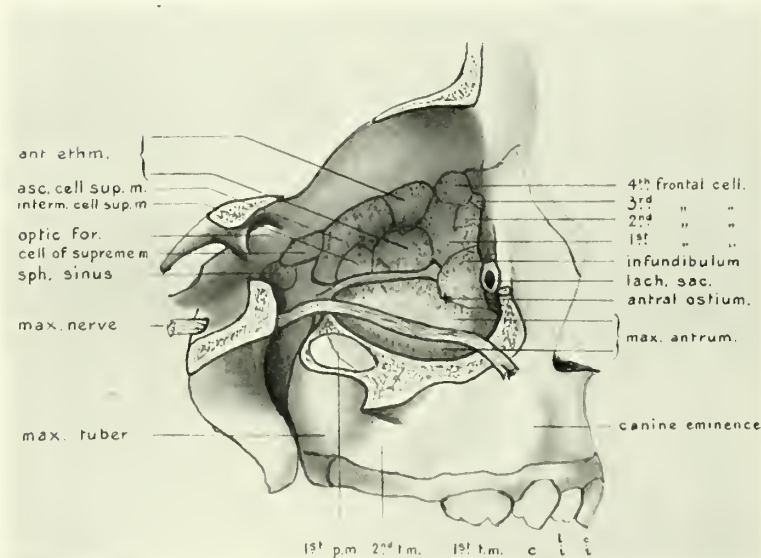
The permanent teeth calcified are the incisors, canines, and first molars. The large upper central incisor is seen through the roots of the two upper milk incisors; the lateral incisor lies internal to the milk canine, but is not distinctly marked on the skiagram. The upper canine is above and behind the root of the milk canine, and its crypt already extends to a higher level than those of the other teeth. The lower lateral incisor is internal to the milk canine, while the canine is deeper and lies below and between the milk canine and first molar.

Fig. 2.—Right Side of Female Infant two years old and 30 inches high.

All the milk teeth have erupted except the second upper molar and the two posterior cusps of the second lower molar. The roots of the second milk molars are now forming, but only the crowns of the first permanent molars are calcified.

Fig. A is from a dissection of this specimen. The maxilla and neighbouring bones were separated from the rest of the skull and part of the lachrymal, the os planum of the ethmoid, a small part of the sphenoid, and the bony roof of the maxillary sinus removed to expose from the lateral aspect the muco-periosteal lining of the accessory sinuses of the nose. The drawing is the natural size, and the specimen is viewed directly from the lateral aspect, and not, as in the skiagram, partly from the front.

FIG. A.



The maxillary sinus measures 2.5 cm. in a sagittal direction, 1 cm. vertically, and 7 mm. from within outwards, so that its main extent is in an antero-posterior direction. It reaches 7 mm. in front and 17 mm. behind its aperture of communication with the nose, and anteriorly lies on the outer side of the nasal duct. The lateral extension of the sinus has proceeded as far as the inner border of the infra-orbital canal. The only tooth that comes into close relation with the sinus at this age is the first permanent molar, the socket of which forms an elevation on the posterior and outer part of its floor, and is covered on the inner third of its upper surface by the sinus.

[In the lettering on this figure, for '4th' frontal cell read '3rd,' for '3rd' frontal cell read '1st,' and for '1st' frontal cell read '4th.']

# PLATE IV

FIG. 1.



FIG. 2.





**PLATE V**

## EXPLANATION OF PLATE V

**Fig. 1.—Right Side of Female Child three years old and 33 inches high.**

All the milk teeth are fully erupted and make a good bite when the mouth is closed, and their roots are fairly developed. The first molar is not only smaller than the second but its walls are also thinner, so that the pulp cavity is more distinct.

This and the three succeeding skiagrams show that the teeth of the first dentition have comparatively thin walls, large pulp cavities, and an open condition of the root canals, all points of clinical importance in the treatment of diseases of the milk teeth.

The crowns of the permanent incisors and canines are almost completely calcified, but their roots have hardly commenced to form. The lower first bicuspid is beginning to calcify, and it occupies its characteristic position between the roots of the first milk molar, from which it is separated by its bony crypt. A faint shadow is perceptible between the roots of the upper first milk molar, which is probably due to the first upper bicuspid. There is no appearance of the second bicuspid, only the crowns of the first permanent molars are formed, and there are no signs of the second permanent molars, although their crypts are seen in process of development.

**Fig. 2.—Right Side of Male Child four years old. I have no note of the height of this boy, but the bones of the extremities are stated to have been distinctly rachitic.**

All the milk teeth are erupted. The upper incisors, the first upper molar, and the first and second lower molars are affected by caries.

The permanent teeth are distinctly more advanced in their growth than in the child three years old. Thus the second bicuspid has commenced to calcify, and also the second permanent molars. The second upper permanent molar appears below and behind the first permanent molar, a position probably due to the imperfect growth of the tuberosity of the maxilla. The presence of the lower second permanent molar is indicated by a minute spot of calcification on its antero-external cusp, and a still smaller point for the antero-internal cusp. In the upper second molar the cusps have apparently joined one another.



# PLATE V

FIG. 1.



FIG. 2.







**PLATE VI**

## EXPLANATION OF PLATE VI

Fig. 1.—Left Side of Male Child five years old and 33½ inches in height.

This boy was short for his age, but his degree of dental development may be regarded as normal. All the milk teeth are in position except the upper lateral incisor and the first molar, which have been lost. The remaining milk teeth show no signs of absorption of their roots, but the deposit of dentine has been small in amount, leaving the pulp cavities and the canals in the roots large.

The permanent teeth are all visible in the skiagram except the third molars. The crown of the lower second permanent molar is smaller than usual, and is turned almost directly inwards. The second bicuspid has commenced to calcify, and the first bicuspid, although more advanced in their development, have still the crowns incompletely formed.

Fig. 2.—Right Side of Boy six years old and 42 inches high.

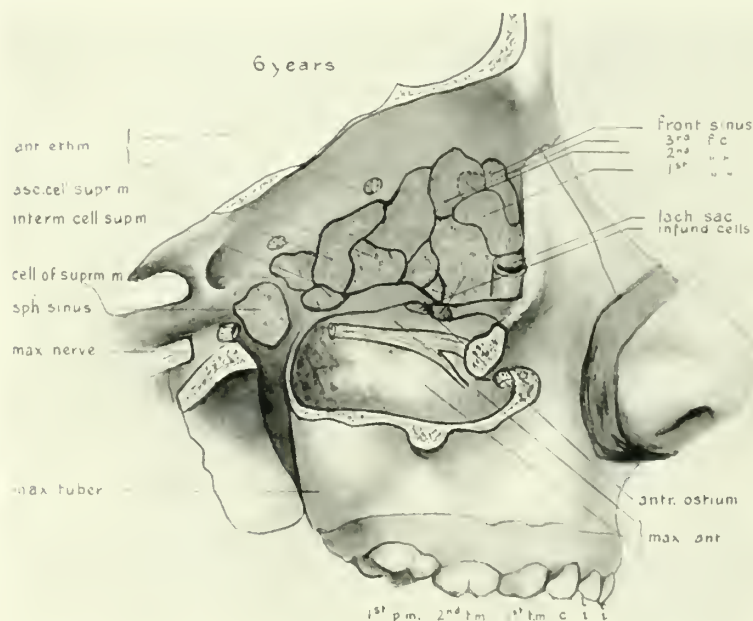
All the teeth, both temporary and permanent, in this beautiful specimen are in an excellent state of preservation, and, as shown in the skiagram, they are all more or less calcified, with the exception of the third molars.

The first permanent molars are erupted, and are in a line with the biting edge of the temporary teeth. The process of absorption of the roots of the milk teeth, with the possible exception of the first molars, does not appear to have commenced. It is somewhat unusual to find the first permanent molars so fully erupted when the temporary incisors are still firmly fixed in position.

The development of the roots of the first permanent molars is still incomplete, as is evident from the size of the openings at the apices of their roots. The permanent incisors and canines exhibit traces of root formation, but in the bicuspid and second molars calcification has not extended beyond the crown. The bony arcades over the bicuspid and separating them from the temporary molars are well seen in the mandible.

The size and shape of the pulp cavities of the two lower milk molars and the first permanent molar, the canals in their roots, the thin dark lines around the roots representing the thickness of the periodontal membrane, and the structure of the alveolar walls between these teeth are shown in the skiagrams with diagrammatic clearness.

FIG. B.



The white spot surrounded by a grey ring on the mandible below the roots of the first permanent molar is due to a flaw in the film of the negative.

Fig. B.—This is a view from the lateral aspect of the right maxilla, &c., dissected in the same way as Fig. A, p. 14. The maxillary sinus is 3 cm. from before backwards, 1.75 cm. from above downwards, and it extends forwards as far as a line prolonged vertically upwards between the first and second temporary molars, and posteriorly to a vertical line about 8 mm. behind the first permanent molar. The opening of the sinus is situated 1 cm. behind the anterior end of the sinus and about 2 cm. in front of its posterior extremity. In front the sinus reaches outwards to the infra-orbital canal, but behind it extends about 4 mm. external to it, and lies above the first and second permanent molars, its floor being about 2 cm. above the grinding surface of the first permanent molar.

# PLATE VI

FIG. 1.



FIG. 2.





**PLATE VII**



## EXPLANATION OF PLATE VII

Fig. 1.—Right Side of Boy seven years old and 44 inches high.

The erupted teeth of the maxilla are the permanent central incisor, temporary canine, first and second temporary molars, and first permanent molar; both milk incisors have therefore been shed, but only one permanent incisor—the central—is through the gum. The three temporary teeth still persisting are more or less carious.

The skiagram shows five permanent teeth embedded in the maxilla, viz. the lateral incisor, the canine, the first and second bicuspid, and the second molar. The roots of the temporary molars are almost entirely absorbed. This specimen shows clearly the high position of the permanent canine as compared with the neighbouring non-erupted permanent teeth, and the irregularity of the dental arch which would arise should the canine begin to descend before the lateral incisor and the first bicuspid have erupted, and by their divergence during the process left room for the canine. There is no trace of a third molar.

The teeth of the mandible correspond to those of the maxilla, except that the lateral milk incisor is still in position. Both the temporary molars are affected with caries.

FIG. C.

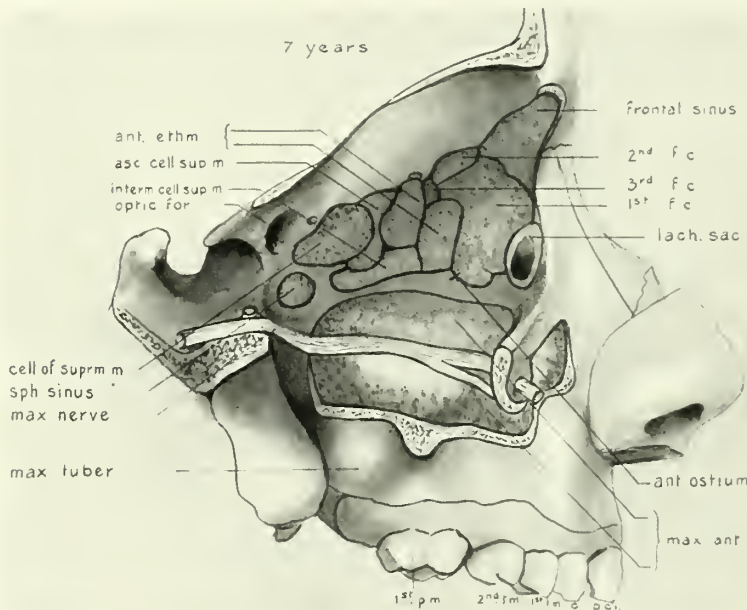


Fig. C is a drawing of the lateral aspect of this specimen dissected to show the lining membrane of the maxillary antrum and other accessory nasal sinuses. This antrum is slightly larger in all directions than that of the boy six years old, being 3.4 cm. from before backwards, 2 cm. from above downwards, and 1.5 cm. from within outwards. Its floor presents posteriorly a prominence opposite the socket for the second permanent molar, and the bone is so thin here that it can be easily pierced with a needle. A little in front of this prominence there is another situated above the alveolus of the second bicuspid. The depression between these two prominences is above the first permanent molar. Opposite the first bicuspid the sinus turns sharply upwards on to the anterior wall, which has a distinct prominence due to the permanent canine tooth.

Fig. 2.—Left Side of same Boy.

The upper dental arch differs from that of the right side, as the temporary lateral incisor is still in position, while the first temporary molar is shed and the first bicuspid erupted. The appearance through the gum of the first bicuspid is obviously premature, as its root is only just beginning to form. The second temporary molar has lost the greater part of its roots, and the second bicuspid, situated just above it, has attained to nearly the same stage of development as the first bicuspid.

The condition of the teeth in this half of the mandible closely corresponds to that of the right side, all the milk teeth being in position except the central incisor.

# PLATE VII

FIG. 1.



FIG. 2.







PLATE VIII

## EXPLANATION OF PLATE VIII

**Fig. 1.—Right Side of Boy nine years old and 48½ inches high.**

The teeth of the upper dental arch through the gum and in position are the central permanent incisor, the temporary lateral incisor with the permanent lateral incisor on its palatine aspect, the milk canine, the first and second milk molars, and the first permanent molar, while embedded in the maxilla are the permanent canines, the two bicuspid, and the second permanent molar. A comparison of this skiagram with that of the boy seven years old shows that the permanent canine, the bicuspid, and the second molars are now more extensively calcified, their roots in this boy being distinctly marked.

In the mandible the permanent central incisor was injured when making the median section, and was subsequently lost. The erupted teeth are the lateral incisor, the temporary canine and first molar, the two bicuspid, and stumps of the first permanent molar. The non-erupted teeth shown in the skiagram are the canine and the second molar.

There is no trace of the third molar or its crypt in either jaw.

**Fig. 2.—Left Side of same Boy.**

In the upper jaw the teeth visible are the central and lateral incisors, the temporary canine, the first bicuspid, the second temporary molar, and the first permanent molar; and the three teeth partially calcified but not yet erupted are the canine, the second bicuspid, and the second molar.

In the mandible are seen the two permanent incisors, both the temporary and permanent canines, the two bicuspid, and the remains of a decayed first permanent molar.

The second molar is just beginning to develop roots, and there are no indications of the appearance of the third molar.

# PLATE VIII

FIG. 1.



FIG. 2.





PLATE IX

## EXPLANATION OF PLATE IX

Fig. 1.—Right Side of Boy ten years old and 4 feet 3½ inches high.

The teeth through the gum of the maxilla are the permanent incisors and canine, the first bicuspid, the second temporary molar, and the first permanent molar, and the three non-erupted teeth shown in the skiagram are the second bicuspid and the second and third molars. This is the first appearance in the series of specimens of a wisdom tooth.

In the mandible all the milk teeth have been shed, and the permanent incisors, canine, first bicuspid, and first molar are erupted. The second bicuspid is nearly through the gum, but the second molar is still deeply embedded, and its roots are only just beginning to appear. The third molar is not visible, but its crypt is beginning to develop.

FIG. D.

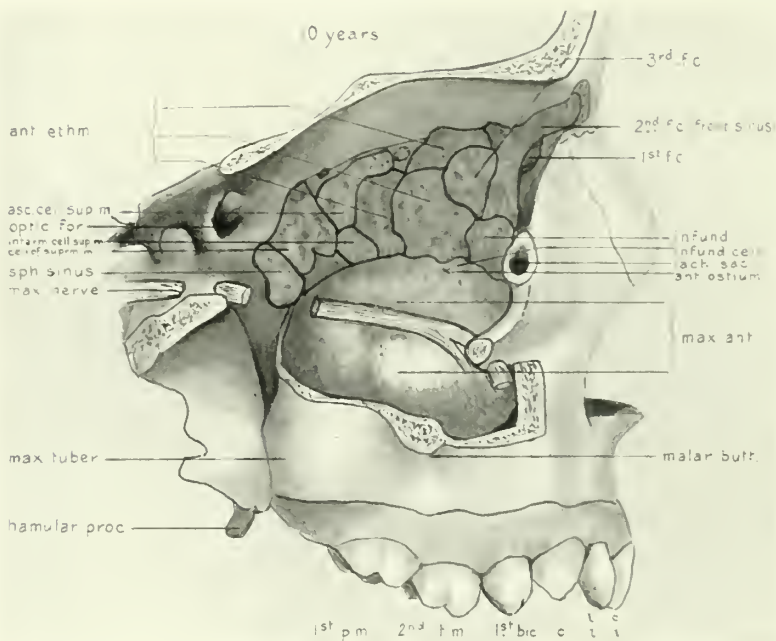


Fig. D is a drawing of the lateral aspect of the right side of the specimen just described, dissected in the same way as Figs. A, B, and C.

The maxillary antrum is almost exactly the same size as in the boy seven years old, the only difference being a slight increase in the transverse diameter. Owing, however, to the eruption of the permanent canine, this tooth is no longer in close relation with the anterior wall of the antrum. The crypt for the second permanent molar forms an eminence on the floor of the antrum, but the position of the third molar is not visible from the internal aspect of this cavity.

Fig. 2.—Left Side of same Boy.

The only trace of the milk dentition in the upper dental arch is a small portion of the second temporary molar situated on the palatine side of the interval between the first bicuspid and the first permanent molar.

The most interesting point demonstrated by the skiagram is the presence of a non-erupted second bicuspid for which there is no space left vacant in the dental arch. The cusps of the upper third molar have begun to calcify.

In the mandible all the milk teeth have disappeared, and the permanent teeth correspond in their position and development with those of the right half of the mandible, but there are no traces of a crypt for the third lower molar.



# PLATE IX

FIG. 1.



FIG. 2.







**PLATE X**

## EXPLANATION OF PLATE X

**Fig. 1.—Left Side of Boy ten years old and 4 feet high.**

The teeth erupted in the upper dental arch are the two permanent incisors, a temporary canine, the first bicuspid, a small piece of the second milk molar, the second bicuspid, and the first permanent molar, and in the skiagram are also seen the permanent canine and second and third molars which have not erupted.

In the mandible there are three temporary teeth still present, viz. the canine and first and second molars, while the permanent incisors and first molar have erupted. The permanent canine, both bicuspids, and the second molar are still beneath the surface of the gum. The crypt for the third molar is quite distinct, although its contained dental germ has not begun to calcify.

**Fig. 2.—Right Maxilla of same Subject.**

The teeth in the dental arch are the permanent incisors, the temporary canine, the first bicuspid, the second temporary molar, and the first permanent molar. It differs, therefore, from the left side in the persistence of the second temporary molar and the associated non-eruption of the second bicuspid. The development of the upper wisdom is more advanced than in the boy of the same year figured in Plate IX.

These two subjects indicate that the upper third molar begins to calcify sooner than the lower, and that the calcification of the wisdom teeth begins at the tenth year, as these teeth were not visible in the boy nine years old.

# PLATE X

FIG. 1.



FIG. 2.





PLATE XI

## EXPLANATION OF PLATE XI

Fig. 1.—Left Side of Girl thirteen years old and 4 feet 6 inches high.

A median section of this girl is represented in Plate I. of my work on "The Topographical Anatomy of the Child," published in 1887. The arteries were injected with a paint containing red lead, and some of the vessels are shown in the skiagram. The upper dental arch is irregular, the first bicuspid bulges outwards, and the permanent canine is displaced towards the palate, so that the canine and bicuspids overlap one another in the skiagram. This overcrowding was mainly due to the retention of the temporary canine, but also to a piece of the second temporary molar remaining in front of the first permanent molar. All the upper permanent teeth are erupted except the third molar.

In the mandible the first and second temporary molars are present, but it is evident from the skiagram that the whole of the first temporary molar is absorbed with the exception of the upper part of its crown. The labial cusp of the first bicuspid and the anterior cusps of the second permanent molar are erupted. The permanent canine, both bicuspids, and the second permanent molar are not yet fully formed, as is shown by the size of the opening at the end of the roots. The third lower molar points almost directly forwards, and has not yet developed any roots.

Fig. 2.—Left Side of Girl sixteen years old and 5 feet high.

In this girl all the teeth are erupted, and are fully developed except the third molars. In the mandible both the first and second molars are carious, and in the first molar the disease has apparently stopped somewhat abruptly near the upper part of the roots. This shows how readily in attempting to extract this tooth the carious portion might break away and leave the roots in their alveoli. The third molars exhibit their characteristic position before eruption. The roots of the upper wisdom tooth are commencing to form, and the crypt for the tooth has caused a distinct elevation in the posterior part of the maxillary antrum. On a comparison of this skiagram with that of the girl thirteen years old it will be seen that considerable progress has been made in the growth of the mandible in the girl

sixteen years old, by which space has been provided for the eruption of the wisdom tooth in front of the level of the ascending ramus.

FIG. E.

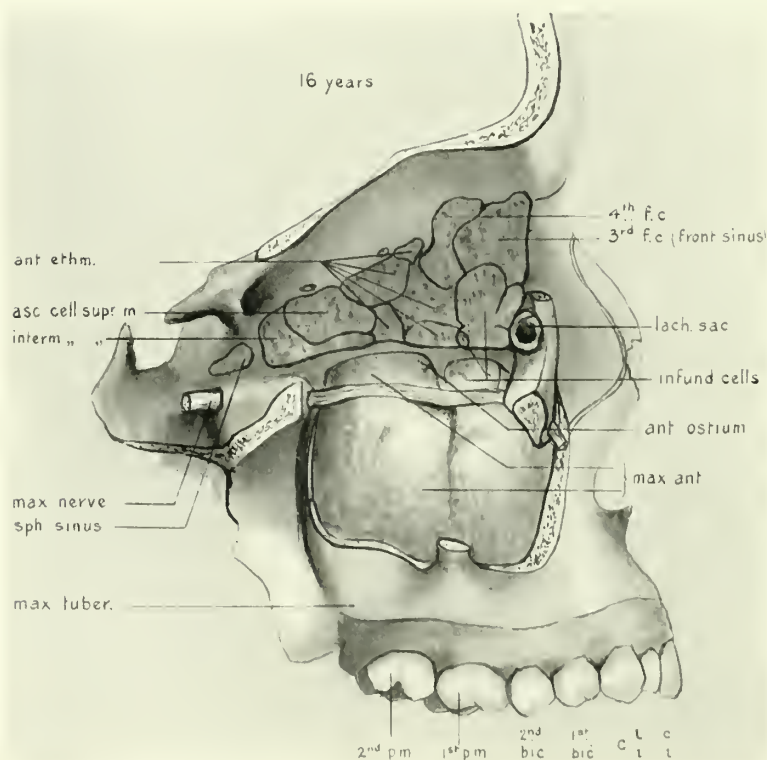


Fig. E was made from the lateral aspect of the right maxilla and neighbouring bones of this girl, the accessory sinuses having been previously exposed in the manner already described. As on the left side, all the teeth are erupted except the wisdom.

The maxillary antrum measured 3.5 cm. sagittally, 3.0 cm. vertically, and 2.5 cm. in a lateral direction. As compared with the boy ten years old (see Fig. D), the antrum has increased about 1 cm. in the vertical and transverse directions, while its antero-posterior extent is the same. The distinct elevation in the floor is here caused by the wisdom tooth, and not, as in the boy ten years old, by the unerupted second molar. The outline of the floor of the antrum on the left side is shown in the skiagram, where it can be followed forwards as far as the first bicuspid before turning upwards to join the anterior wall.



# PLATE XI

FIG. 1.



FIG. 2.





**PLATE XII**

## EXPLANATION OF PLATE XII

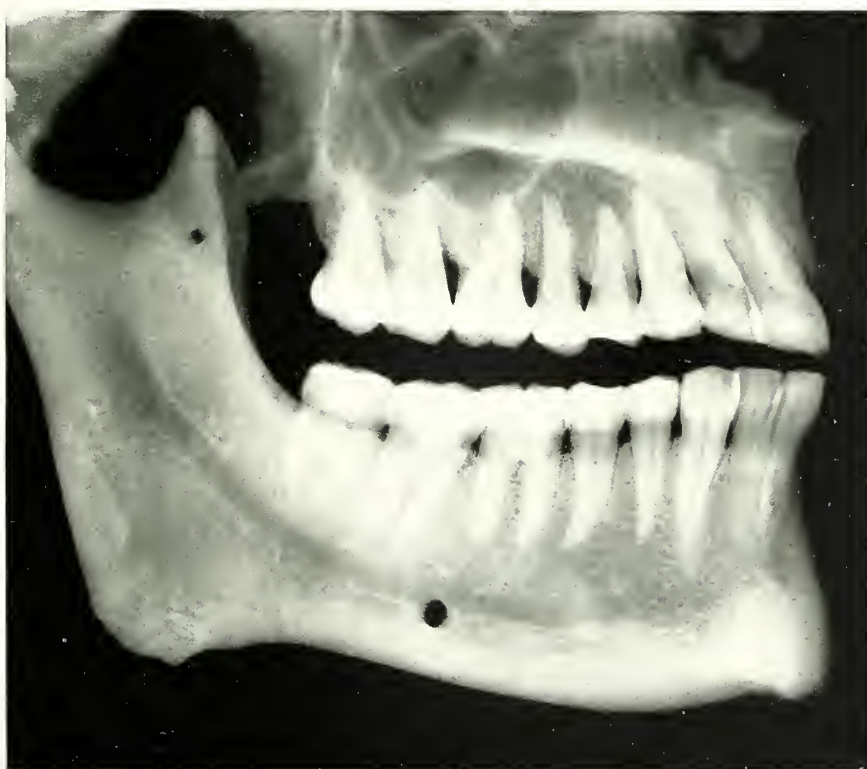
### Adult Male, Right Side of a Macerated and Dried Skull.

This specimen was taken from a dissecting-room subject, the skull of which was macerated and mounted in the anatomical museum as an example of a well-developed set of teeth. The skiagram fully confirms this diagnosis, for the roots as well as the crowns of the teeth. Owing to the extensive growth of dentine and the consequently solid character of the teeth, their pulp cavities are small.

The course of the inferior dental canal is distinctly seen in the skiagram. It terminates opposite the anterior part of the second bicuspid. The two black spots on the mandible are due to holes made in the bone when it was mounted.

The posterior wall of the antrum is indicated by a white line passing downwards and a little backwards, slightly behind the level of the posterior border of the upper wisdom tooth. This line is continued forwards in close relation to the roots of the three molar teeth, and maps out the level of the antral floor. Opposite the first molar it turns upwards and forwards, passing near the fang of the second bicuspid. The skiagram also shows that the antrum extends downwards below the level of the hard palate opposite the molars, and that the deepest part of the sinus is between the roots of the first and second molars.

PLATE XII



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